GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering (VLSI System Design Engineering)
Semester – II

Subject Code: 1724203

Subject Name: RF CMOS IC Design (Major Elective-II)

Sr. No.	Course Content
1	**Introduction to RF Design and Wireless Technology:** Design and Applications, complexity and choice of Technology, Basic concepts in RF Design: Nonlinearity and Time variance, Intersymbol Interference, random process and noise, sensitivity and dynamic range, conversion of gain and distortion.
2	**RF Modulation:** Analog and Digital Modulation of RF Circuits, comparison of various techniques for power efficiency, Coherent and non coherent detection, Mobile RF Communication and basics of Multiple Access techniques, Receiver and Transmitter architectures. Direct conversion and two-step transmitters.
3	**RF Testing:** RF Testing for heterodyne, Image reject, Direct IF and sub sampled receivers.
4	**BJT and MOSFET behavior at RF Frequencies:** BJT and MOSFET behavior at RF Frequencies, Modeling of the transistors and SPICE model, Noise performance and limitations of devices, integrated parasitic elements at high frequencies and their monolithic implementation.
5	**RF Circuit Design:** Overview of RF Filter Design, Active RF Components and modeling, Matching and biasing Networks. Basic blocks in RF system and their VLSI implementation, Low noise Amplifier Design in various mixers-working and implementation. Oscillators- Basic topologies VCO and definition of phase noise, Noise power and trade off. Resonator VCO designs, Quadrature and single sideband generators. Radio frequency Synthesizers-PLLS, Various RF synthesizers architectures and frequency dividers, power amplifier design, liberalization techniques, Design issues in integrated RF Filters.

Laboratory work: It will consist of 10 to 12 experiment based on above syllabus.

Text/References:

1) Thomas H. Lee “Design of CMOS RF Integrated Circuits” Cambridge University Press 1998.
2) B. Razavi “RF Microelectronics” PHI 1998.
3) R. Jacob Baker, H. W. Li, D.E. Boyce “CMOS Circuit Design, Layout and Simulation” PHI 1998.
4) Y. P. Tsividis “Mixed Analog and Digital Devices Technology” TMH 1996